Bioethics Issues in a Biobased Economy

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There is now a 25-year history of debate over ethical issues associated with recombinant DNA, beginning with the 1975 Asilomar conference to consider the risks and advisability of basic gene-transfer research. Early in that history, issues associated with medicine or the manipulation of human DNA quickly came to be treated as wholly distinct from those associated with every other application of biotechnology. Today, virtually all non-human, non-medical applications of biotechnology are classed as agricultural biotechnology. The only significant exception to this generalization is genetic engineering and cloning for xenotransplantation, which overlaps both medical and agricultural categories.

Controversy over specifically *agricultural* biotechnology really began in about 1984, when Jeremy Rifkin's lawsuit forced the National Institutes of Health's Recombinant DNA Advisory Committee (the RAC) to consider the possible environmental impact of ice-nucleating bacteria proposed to protect crops such as strawberries from frost damage. Social scientists had, by that time, already begun to speculate on the possible impact of a new generation of technologies on the structure of American agriculture, the lot of developing countries, and on the organization and funding of agricultural research worldwide. The National Agricultural Biotechnology Council was founded in 1989 in part as a forum in which to air these controversies. As we gather for the twelfth annual conference to discuss a new generation of technologies not geared to food production, I cannot but sense a hope that these new technologies are so full of prospect that the ethical controversies of the past will now fall by the wayside. As I myself argued in my 1996 remarks to this group (Thompson 1996), there are reasons why that hope need not be vain. But I believe it is best to begin with a look to the past.

Most ethical issues that were tied to agricultural biotechnology over the last fifteen years fall into one of four categories: food safety, environmental impact, animal ethics, and social consequences. I will speak very briefly about each, then will focus the balance of my remarks on a fifth type of issue that spills over from the category of social consequences to encompass the entire debate over agricultural biotechnology. This fifth class concerns how bioethical issues are addressed within advanced industrial democracies, and takes up the question of public trust in science. One could say that comportment with respect to ethical issues is itself the most significant ethical issue facing the scientists, administrators and public servants charged with the development of agricultural biotechnology. However, virtually all of the issues that have been tied to agricultural biotechnology in the last 25 years could have also been raised with respect to other technologies, both within agriculture and for society at large. Debate over agricultural biotechnology is, in this sense, a surrogate for debate over technological progress itself.

Ethical Issues for Agricultural Biotechnology: A Quick Survey

If one's cue were taken from the newspapers or from industry spokespersons, the hottest issue associated with agricultural biotechnology would be food safety. The core issue of ethics associated with the safety of genetic transformation applied to foods (or so-called GMOs) concerns the comparative emphasis on science-based food safety risk assessment as opposed to a policy of informed consumer consent (Thompson 1997). Some argue that individual consumers must not be put in a position where they are unable to apply their own values in choosing whether to eat GMOs. Others argue that the matter of whether genetic transformation has been used is immaterial to the underlying values (such as safety and healthfulness) that are the basis of consumer choice. They argue that the very act of informing consumers about GMO foods would mislead consumers into making choices that are not consistent with the underlying purposes that are sought through the purchase and consumption of food. This is an ethical issue rather than a simple dispute over facts because one viewpoint stresses individual autonomy and consent, while the other stresses rational optimization. The tension between these two ways of stating the most basic norms of decision-making has been endemic to some of the most protracted ethical debates of the last 200 years. Needless to say, it is possible for reasonable people to disagree.

After food safety, the environmental impact of agricultural biotechnology has received a great deal of play in the media. Some critics of agricultural biotechnology argue that we cannot even imagine the possible environmental consequences of genetic transformation. Other critics note some of the specific environmental consequences that have in fact been imagined with respect to products such as herbicide-tolerant or Bt crops, and argue that the risks are

unacceptable. Defenders note the procedures for environmental risk assessment that are in place. They argue that these present adequate safeguards for the environment, and note that agricultural biotechnology may well have environmentally beneficial effects that outweigh any risks.

These environmental debates involve far more controversy over factual issues than do debates over food safety, but they still involve ethics. Like debates over food safety, they involve disputes over the validity and wisdom of relying on offsetting cost-risk-benefit optimization to conceptualize the issues. Even among those who accept the risk-benefit approach, the issues involve value judgements about the relative importance of food production as opposed to the preservation of wildlife and genetic diversity. They involve value judgments about how to proceed in the face of uncertainty, and indeed, about the very nature of uncertainty. The issues involve value judgments even about the nature of nature, as some believe that preserving wildlife and a certain aesthetic character on farms is part of nature conservation, whereas others see agriculture as inimical to wild nature. Again, it is possible for reasonable people to disagree.

Perhaps we should class the potential for biotechnology's impact on animal welfare as a sub-heading of environmental effects. It has seemed like a different class of issue to most observers because the focus has been on domesticated rather than wild animals, and because the ethical issues themselves are quite different from those listed above. Here, what is contentious, is the possibility of using gene transfer in a way that eventuates in an increase in suffering for domesticated livestock, *or* ironically, using gene transfer to relieve suffering by creating animals that are more tolerant of conditions that animal advocates currently find intolerable. Animal welfare is an ethical issue because the moral status of animals is itself one of the most fiercely contested ethical issues of the late twentieth century. Reasonable people disagree.

Finally, there are people who have framed the debate over agricultural biotechnology in terms of its social consequences. Indeed, many of the arguments *for* the deployment of agricultural biotechnology note its capacity to feed the poor and benefit farmers while keeping the cost of food low for all. Critics, on the other hand, fear that biotechnology will only turn the crank of the technological treadmill that has caused many farm bankruptcies and depleted the population of rural communities for 100 years. Some critics fear that biotechnology will be the instrument for a similar kind of consolidation of land holdings in the developing world. Others argue that the transformation in the international system of intellectual property rights, which has accompanied the advent of agricultural biotechnology, may not be in the interests of poor farmers in the developing world. Still others have argued that agricultural biotechnology has precipitated a change in the nature of science itself, particularly at public institutions such as universities, resulting in a skewed allocation of resources and corporate control over research priorities. The social

consequences of agricultural biotechnology are controversial in part because all of them — those that note biotechnology's putative benefits as well as those that call attention to its social costs — make disputable causal claims about the link between technological innovation and its eventual social impact. With all due respect to my colleagues in the social sciences, the models for social causation in economics, sociology, anthropology, geography, and political science continue to be beset with gaps and ambiguities that render them vulnerable to protracted methodological disputes and ideological influence. For this reason, disputes over social consequences take on a character that is more often political than ethical. Much of what divides disputants over the social consequences of agricultural biotechnology concerns different opinions about the capacity for various forms of social organization, notably private markets and government agencies, to reliably produce desired social outcomes.

Yet, there is still an explicitly ethical dimension to these debates. For example, when someone says that genetic engineering will benefit the poor, they are at least implicitly suggesting that not only is benefiting the poor a good thing, but that it is relatively better than benefiting someone else. There are, thus, ethically grounded notions of fairness and distributive justice lurking in debates over social consequences. Reasonable people disagree about what they and others deserve, what is fair, and how the resources of our society should be distributed. Such disagreements are inherently philosophical, and have been the very stuff of ethics and of social and political philosophy ever since Plato.

So, there are four large issues raised by, or associated with, agricultural biotechnology on which reasonable people disagree. This conference is dedicated to emerging applications of biotechnology that do not involve foods. We may reasonably conclude that issues associated with food safety and individual consent will not be associated with these new agricultural technologies. But this is only one of the four types of issue that have dogged agricultural biotechnology for over 15 years, and it is arguably the simplest and least intrinsically contentious of the four. I must, therefore, conclude that the hopes for a new day and an ethical pass with respect to the biobased economy are probably not in the cards.

Agricultural Bioethics: Public Discourse and Public Trust

So, finally, we come to that fifth comprehensive issue, which we might call the "trust" issue. Does biotechnology — understood not merely as the laboratory techniques or the products themselves but as the consortium of industry and academic researchers, government regulators and research administrators that has shepherded recombinant DNA techniques from basic research through product launch — merit the public's trust? Notice that the question of whether biotechnology merits public trust differs from whether biotechnology is, in fact, trusted. When the matter of trust is framed as a question of merit, of trustworthiness, it becomes an ethical issue in itself.

Even in an explicitly ethical mode, the question of trust inevitably connects with the broader public's attitudes and perceptions of biotechnology. My suggestion today is that the way that researchers, regulators and administrators comport themselves with respect to the ethical issues I have already reviewed, albeit briefly, is the largest single factor in determining whether they are trustworthy. I will make some speculative remarks about public skepticism regarding agricultural biotechnology, but I must stress that I will not try to explain why agricultural biotechnology is mistrusted in fact. Nor do I believe that the relationship between being trustworthy and being trusted in fact is a simple or straightforward one.

First, a simple observation: none of the ethical issues listed above — issues on which reasonable people disagree — depends on active political opposition to biotechnology for their definition or significance. Each would be an ethical issue even if virtually no one was sufficiently concerned about agricultural biotechnology to carry placards, write angry letters or construct web pages that espouse a given analysis of each issue, while recruiting fellow travelers. An issue does not become "ethical" simply by virtue of its popularity, but because deep and systematic differences in values and interpretations open up the possibility for incompatible prescriptions for action. Throughout human history, it has often been the case that a small minority, sometimes a single individual, seizes on a vital difference and opposes a strong majority point of view. These minority viewpoints need not, and historically often have not, represented anything even remotely like widespread public doubt or opposition to the mainstream point of view. So we should not equate a response to ethical issues and a response to public concerns.

In some cases, the proper response to public concerns is a public relations campaign designed to sway citizens in the mainstream to a point of view more consistent with one's own interests. Such a campaign may eschew serious discussion of issues, choosing instead to associate a product or person with favorable images, or to associate opponents with unfavorable images. In such cases, the issue that has given rise to public concern is handled strategically. I shall use the term "strategic discourse" for any form of communication that tries to bolster public support for an objective (or mute public opposition) in an effective and efficient manner. Characteristically, a form of communication is strategic whenever the alteration or manipulation of audience attitudes and behavior is the dominant criterion for success.

I hope it is evident to everyone that strategic discourse is never an appropriate response to an ethical issue. In having too little concern with mutual understanding, strategic discourse disrespects those with differing values and differing points of view. Discourse ethics is a program in philosophy that prescribes a general approach for ethical issues (Habermas 1990). We might summarize it in common-sense terms by saying that ethical issues must not be treated simply as obstacles to be overcome in the pursuit of other goals.

They must instead be addressed seriously and in their own terms. When one is presented with an ethical objection to an opinion or course of action, one has a responsibility to ensure that one has first understood the force of that objection. Second, one must either alter the opinion or course of action to accommodate the objection, or offer a response that explains why the objection has been rejected. This means that those who offer an ethical objection are owed a reply. The reply should restate the objection in terms that the person who offered the objection can accept. If the terms are not accepted, one must conclude that one has not understood the objection, and try again.

If your reply to an objection involves a rejection of it, you owe the person who offered the objection an opportunity to reply to your reply, which, of course may occasion further objections and replies. Obviously, this is a process that can go on at some length, so we must regard this characterization of discourse ethics as an idealization, and we must recognize that time and resource constraints limit the extent to which ideal discourse can be realized in practice. There is the further problem that the back and forth process of objection and reply can itself be deployed not in pursuit of seriousness and mutual respect, but as a delaying tactic. Anyone who has ever attended a public meeting on biotechnology within fifty miles of the Washington beltway knows exactly what I am talking about. Despite these shortcomings, I believe that it is still possible to conduct practical ethical discourse. While falling short of the unrealizable ideal case in which all objections are fully answered, practical discourse does treat ethical issues with the seriousness that they demand.

I believe that serious practical discourse is possible because I believe that I do it all the time myself. It is the standard to which I have aspired in all my research and writing on agricultural biotechnology. I have seen it at the "bioethics workshops" sponsored by Iowa State University, and even on occasion at the annual meetings of the NABC. As further evidence, I would submit that that the Ethical, Legal and Social Implications (ELSI) program of the Human Genome Initiative has supported a great deal of serious practical discourse on the goals and implications of human genetics. I believe that there should be a similar program in agricultural biotechnology, but here I get ahead of my main message.

Strategic and practical discourse are analogous to some criteria we rely upon when we determine whether an individual person is trustworthy. Trustworthy people display thoughtfulness of purpose and a clear capacity to be mindful of the interests of those by whom they are trusted. We do not trust people who seem to be making reference to their own immediate goals and self-interest at every moment. Similarly, I think that we can say that groups or associations of people who always seem to be engaged in strategic discourse, and never in serious practical discourse are manifestly not trustworthy. This is not necessarily a judgment that reflects on the moral character of the individuals involved. People who are fine, upstanding and virtuous citizens in their own

right may well be involved in groups or associations that are untrustworthy in virtue of the fact that serious discourse about ethical issues occurs infrequently in these groups and associations. We should not expect groups and associations to avoid strategic discourse on every occasion. That would be like asking someone to be a saint, always putting others' interests before her own. But just as we mistrust the person who seems unable to even contemplate a situation with respect to others' interests, we mistrust the group or association that displays no evident interest in, or experience with, serious practical discourse.

We can bring this observation to the point at hand by considering the three key technologies of the post-war era as described by Martin Bauer: nuclear power, information technology, and biotechnology. According to Bauer (1995), these three are particularly relevant to the problem of public acceptance and trust, because each has been presented to the public as a technology that would revolutionize the way we live. While the scientists, engineers, regulators and power-company officials who developed and promoted nuclear energy displayed seriousness with respect to the safety of their technology, they have never been particularly willing to engage in practical discourse about the social, legal and ethical issues posed by nuclear power generation. In contrast, computer professionals have carried on robust debates about a host of ethical issues from privacy rights to intellectual property and the impact of a wired society on interpersonal relations. Early on, they formed the Computer Professionals for Social Responsibility to promote debate over the risks of inadvertent nuclear war due to computer failure, and this group went on to promote both discussion and activism about access to computers for the poor. Even as the public seemed willing to embrace information technology uncritically, the critical voices emerged from within the culture of the computer industry, and demanded that ethical issues be taken seriously.

How then does biotechnology fare in the comparison? My answer is, better than nuclear power, but worse than IT. On the plus side, molecular biologists got off to an admirable start with Asilomar, and the previously mentioned ELSI program has ensured that medical bio-ethicists are deeply involved in discussions of the future human applications of gene technology. On the agriculture side, there are a few programs here and there, including my own Center for Biotechnology Policy and Ethics, which operated at Texas A&M University from 1991 to 1998. The Executive Council of the National Agricultural Biotechnology Council adopted a comprehensive endorsement of the need for universities to create a climate hospitable to debate and learning about the ethical dimensions of biotechnology in 1997. The National Agricultural Biotechnology Council annual conferences, which began in 1989, are themselves the most visible and substantive vehicle for non-strategic discourse on ethical issues in North America.

On the minus side, I must say that these activities have gone along in fits and starts. Scientists and administrators have been far more interested in talking

about ethical issues when agricultural biotechnology was getting negative publicity in the press than when things were going smoothly. Furthermore, many substantive criticisms of biotechnology have not been treated as concerns deserving respect and reply, much less a change in direction. When environmental or social issues are raised, defenders of biotechnology too often shift the subject to food safety or attack the sincerity and motives of their critics. This tendency to change the subject reveals a preoccupation with strategic thinking, and undermines an observer's confidence that serious issues are being treated seriously. I cannot help but draw the same conclusion that a casual observer of the debate would draw. Commitment to serious practical discourse and a critical consciousness among the individuals and organizations who have been involved in the application of molecular biology to agriculture and in the development of new agricultural biotechnologies has not been particularly deep.

CONCLUSION

Among those who have thought and written about the ethical issues that arise in connection with agricultural biotechnology, I have never been one who thought the use of recombinant techniques posed unique risks or exceptional ethical issues. I do think that the organization and culture of agricultural R&D is insufficiently attentive to a wide range of social, environmental, legal and ethical issues that ride along with any significant technological innovation. I thus think that biotechnology provides an important case study and object lesson for some of the questions that we should be debating with respect to the ecological meaning of agriculture, and the impact of technical change on our social institutions, not to mention the poor. In one sense, I regret that I have not taken this opportunity to address some of those questions directly, but there is only so much that can be done at any given time or place.

It will not suffice to leave these issues to the final stage regulators or adopters of technology. Scientists, educators and administrators must institutionalize continuous critical reflection on their activities, and they must find some way to make that reflection effective in shaping the agenda for research and the deployment of technology. I am not of the opinion that the present status quo is wholly inadequate with respect to its capacity for ethical reflection and serious practical discourse. Indeed, remarkable strides have been made during the last 25 years. Nevertheless, we may not be sanguine about the status quo, either.

There is the distinct prospect that the specific technologies being discussed at this conference will be described and promoted in a manner that will only perpetuate the tendency to avoid seriousness with respect to ethical issues, and will provide even greater opportunity to deploy the strategy of changing the subject. How often I have heard the phrase, “All we need is a product with consumer benefits!” For the life of me, I cannot find a way to interpret such language as anything other than a thoroughly strategic preoccupation with the

manipulation of biotechnology's public image. I can appreciate that not everyone involved with biotechnology needs to be engaged in serious discussion of the issues I have raised in my talk. There is room for people who are concerned with its public image, and who are preoccupied with selling a product. I just hope there is room for something else, too.

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